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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/GB95/00152 (22) International Filing Date: 26 January 1995 (26.01.95) (30) Priority Data: 9401902.3 1 February 1994 (01.02.94) GB (71) Applicant (for all designated States except US): SCAPA GROUP PLC [GB/GB]; Oakfield House, 93 Preston New Road, Blackburn, Lancashire BB2 6AY (GB). (72) Inventors; and (75) Inventors/Applicants (for US only): SAYERS, Ian, Christison [GB/GB]; 30 Chesterbrook, Ribchester, Near Preston, Lancashire PR3 3XT (GB). VALENTINE, Craig [GB/GB]; 30 Logwood Street, Blackburn, Lancashire BB1 9TV (GB). (74) Agents: GOODWIN, Mark et al.; Wilson, Gunn M'Caw & Co., 41-51 Royal Exchange, Cross Street, Manchester M2 7BD (GB).</p>		<p>(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MN, MW, MX, NL, NO, NZ, PL, PT, RO, RU, SD, SE, SI, SK, TJ, TT, UA, US, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD, SZ).</p> <p>Published With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</p>
<p>(54) Title: INDUSTRIAL FABRIC</p> <div data-bbox="337 1129 1250 1680"> </div> <p>(57) Abstract</p> <p>A method of making a polymer coated industrial fabric by urging a polymer film coated release sheet (14) towards a textile substrate (11), curing the polymer and removing the release sheet. The polymer coating is ideally reticular, i.e. it comprises a network or two dimensional pores thus providing permeability.</p>		

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INDUSTRIAL FABRIC

The present invention relates to industrial fabrics such as papermachine clothing or like fabrics.

When in use industrial fabrics suffer from the problems of fibre shedding and wear. The present invention seeks to address these problems.

One known method of surface modification for industrial fabrics such as corrugator belts comprises the lick-roll application of water-based acrylic polymer. This process is not particularly reliable.

According to a first aspect of the present invention there is provided a method of making an industrial fabric including the steps of providing a textile substrate, providing a film forming polymer affixed to a release sheet, applying said polymer to a surface of the base cloth, curing the polymer and removing the release sheet so as to provide an industrial fabric having a textile substrate, at least one surface of which is coated with and/or is impregnated by the film forming polymer. Examples of suitable film forming polymers include epoxy resins, plastisols (i.e. a polymer dissolved in the bare minimum of solvent) or aqueous polyurethane systems.

The fabrics of the present invention have particular application as press felts. The fabrics may also be used in corrugator belts in which the polymer coating is applied at the edge regions of the fabric to increase the abrasion resistance of these areas. The fabrics are also suitable as filter cloths where the improved smoothness of the fabric

surface resulting from the coating gives improved cake release.

The polymer film provides a harder more wear resistant surface having improved abrasion resistance. It also prevents fibre shedding. A further advantage, when used as a coating for papermakers fabrics, is that the improved surface smoothness reduces the start-up time required on the paper machine. Normally a fabric has initially to be run on a machine for a certain amount of time to smoothen the surface before it can be put into action.

The method of the invention may advantageously be used to provide reticular polymer coatings; i.e. coatings comprising a network of two dimensional pores thus providing permeability.

According to a second aspect of the present invention there is provided an industrial fabric comprising a textile substrate, wherein at least one surface of the textile substrate is coated with and/or is impregnated by a film forming polymer, the polymer coating being reticular.

The use of the release paper method of resin application enables the fabric heat-setting step to be combined with the resin treatment if desired, and whereas conventional coating processes utilise aqueous resin emulsion systems which require a large energy input to remove water, the method according to the invention consumes only a small amount of energy. The reticulated resin coating ensures that fibre shedding is reduced due to a more effective bedding down of protruding surface fibres. This method is also advantageous in that the

absence of waste effluent or solvents means that the process is more ecologically acceptable. Further refinements include the utilisation of a more uniform or lower denier fibre batt surface. The greater fibre density at the surface, controlled by known methods such as choice of batt fibre denier and/or needling technique, enables a more uniform resin application to be achieved, thereby reducing brittleness by reducing the opportunity for resin-rich areas to form. Toughness can be improved by increasing cure time at the expense of cure temperature.

The release sheet may typically comprise silicone release paper, aluminium foil or polyethylene or PTFE-coated non-woven fabrics. The polymer would be in the form of a film.

The textile substrate may be fed over at least one roller. The release sheet would be fed into the nip between the textile and one of the rollers. The paper is held under tension to prevent creasing. The angle of application of the release sheet to the substrate/roller is preferably in the range from 35 to 55°, and more preferably is substantially 45°. The angle of application is important in ensuring that a uniform resin coating is applied, and for preventing creasing of the release sheet, by ensuring that the release sheet is kept at high tension.

The rollers are preferably heated at 160-200°C depending on the polymer applied, thereby enabling the resin film to be heat cured, although it may be possible to use chemically, moisture or air-curable resins, eliminating the need for heated rollers, although some heat may be required to bring

about the desired reticulation. Reticulation depends on the surface characteristics of the release sheet and the influence of heat. The surface characteristics of the release sheet can be selected such that the desired reticulation of resin on the fabric is achieved.

A compaction roller is preferably used to force resin into the fabric surface, enhancing the film smoothness. One or more layers of resin may be applied.

The reticulation of the film can be explained by the fluidisation of the resin at high temperatures which is now unable to wet out the surface of release sheet due to the low surface energy of the paper, and hence form droplets. These droplets interconnect and when applied to the fabric surface they reticulate around the surface fibres.

In order that the present invention may be more readily understood specific embodiments thereof will now be described by way of example only with reference to the accompanying drawings in which:-

Fig.1 is a schematic diagram showing a method of making industrial fabrics in accordance with the present invention; and

Fig.2 is a plan view showing the reticulation of a resin on a release sheet, the release sheet being used in the method of producing a fabric in accordance with the present invention.

Fig.1 shows apparatus 10 for applying an epoxy resin coating. The textile substrate 11 is located over two large rotatable cylinders 12,13 at least one of which being heated.

An epoxy film is provided on a release paper 14. The coated release paper is mounted on a feed roller 15 and fed under tension to the nip between one of the heated drums and the textile. The coating is thus applied to the inside of the fabric belt. The used release sheet is removed as it passes out from the top of the roller and is fed to a take-up roller 16. A compaction roller 17 is optionally provided for forcing resin into the fabric surface region. The coated fabric is turned inside out after curing the resin, so that the resin coated side of the fabric is located on the outside of the belt, i.e. the paper side.

Fig.2 shows a release sheet for providing a fabric with a reticulated coating of epoxy adhesive. The resin coating on the release paper and thus the applied fabric coating have apertures therethrough. These apertures in the resin coating on the fabric expose the fabric located below, thus providing a permeable coating.

EXAMPLE

A sample was obtained by coating a needled press felt with Fibredux 913G, (RTM of Ciba Composites) comprising a water-insoluble polyfunctional epoxy resin (containing modified dicyandiamide) cast on a release sheet to give a film of 34 g/m² thickness, using a roller temperature of 120-160°C, and compaction roller pressure of ca. 20kg/cm².

The fabric treated with two resin layers was found to have an air permeability of 59.5 (64) cfm, retained 95.7 (85.7)% original thickness after 5000 rubs against a standard carborundum sandscreen at 21 oz pressure, R₂D surface

roughness of 28 (32) microns (measured using a Surcom surface profiling device) thickness of 3.47 (3.32)mm and a weight of 1.1505 (1.361)g/M². The figures in brackets are for an untreated sample.

It is to be understood that the above described embodiments are by way of illustration only. Many modifications and variations are possible.

CLAIMS

1. A method of making an industrial fabric including the steps of providing a textile substrate, providing a film forming polymer affixed to a release sheet, applying said polymer to a surface of the base cloth, curing the polymer and removing the release sheet so as to provide an industrial fabric having a textile substrate, at least one surface of which is coated with and/or is impregnated by the film forming polymer.
2. A method of making an industrial fabric as claimed in claim 1, characterised in that the polymer coating is reticular.
3. A method of making an industrial fabric as claimed in claim 1 or claim 2, characterised in that the polymer comprises any of the following: an epoxy resin, a plastisol or an aqueous polyurethane system.
4. A method of making an industrial fabric as claimed in any preceding claim, characterised in that the release sheet comprises any of the following: silicone release paper, aluminium foil, polyethylene or PTFE-coated non-woven fabric.
5. A method of making an industrial fabric as claimed in any preceding claim, characterised in that the polymer coated release sheet is fed to the textile substrate at an angle in the range from 35 to 55°.
6. A method of making an industrial fabric as claimed in any preceding claim, characterised in that the polymer coated release sheet is fed to the textile substrate at an angle of substantially 45°.

7. A method of making an industrial fabric as claimed in any preceding claim, characterised in that the polymer is heated in order to cure the polymer and/or bring reticulation.

8. A method of making an industrial fabric as claimed in any preceding claim, characterised in that the industrial fabric comprises papermachine clothing, a corrugator belt or a filter cloth.

9. An industrial fabric comprising a textile substrate, characterised in that at least one surface of the textile substrate is coated with and/or is impregnated by a film forming polymer, the polymer coating being reticular.

10. An industrial fabric as claimed in claim 9, characterised in that the industrial fabric comprises papermachine clothing, a corrugator belt or a filter cloth.

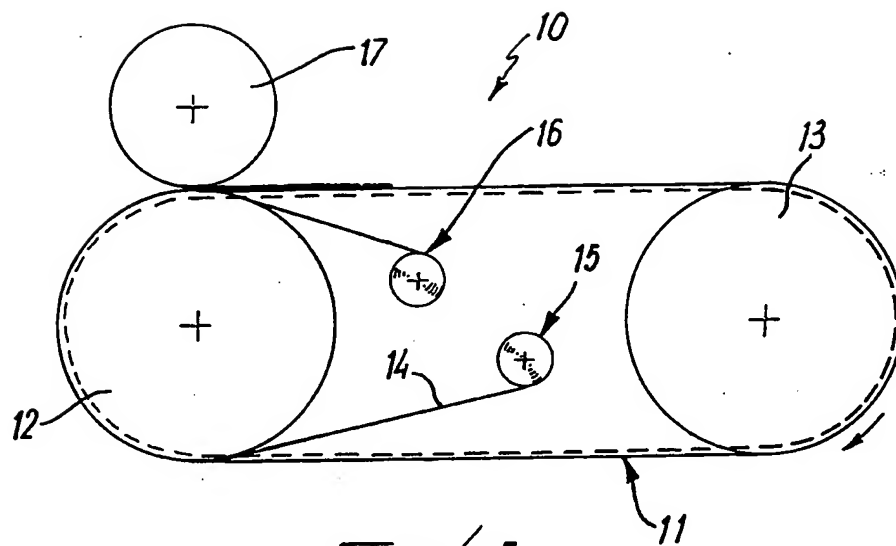


FIG. 1

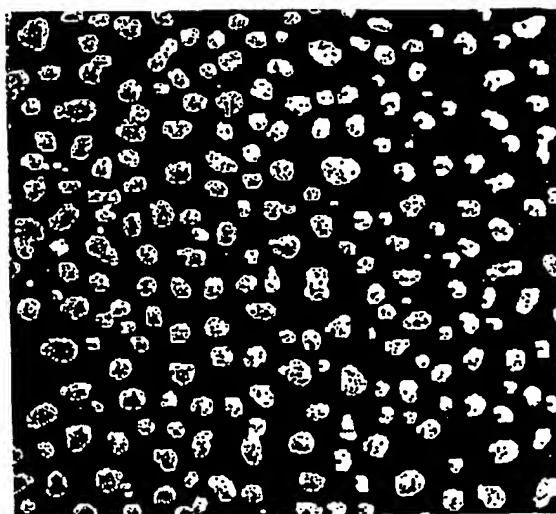


FIG. 2

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 95/00152

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 D06M23/16 D06Q1/12 D21F1/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 D06M D06Q D21F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE,A,20 63 385 (THIOKOL CHEMICAL CORP.) 8 July 1971 see claims; figures see page 12, line 11 - page 14, line 25 ---	1-3,7
X	FR,A,2 327 356 (LEWIS) 6 May 1977 see claims; example 5 ---	1-4,7
A	FR,A,2 329 798 (SCAPA-PORRITT LTD.) 27 May 1977 see claims see page 1, line 32 - page 2, line 25 -----	1,9

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